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Obesity among adolescent students in private and public schools investigation of awareness: a cross-sectional study

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ABSTRACT

Aims: The aim of this study was to examine the obesity awareness of adolescent students in private and public schools.

Methods: The research is a quantitative study. The research group for the study consisted of 1393 private and public school students between the ages of 10 and 13 in Kırıkkale province. The first stage included a personal information form including questions about gender, age, BMI, socio-economic status, physical activity for half an hour or more per week, and daily food distribution. In the second stage, the Obesity Awareness Scale developed by Allen (2011) and adapted into Turkish by Kafkas and Özen (2014) was used. The scale consists of 3 sub-dimensions and 20 questions.

Results: It was observed that there was a significant difference in the anthropometric characteristics, obesity awareness, nutrition and physical activity, BMI, daily food distribution, and socio-economic status groupings of private and public school children. It was seen that there was a significant difference in all other variables and sub-dimensions except body weight, BMI, and obesity total between girls and boys; there was a significant difference in all other variables except anthropometric characteristics of girls in private and public schools; and there was a significant difference in all other variables except the age variable of boys in private and public schools.

Conclusion: The anthropometric characteristics, obesity awareness, nutrition and physical activity, BMI, daily food distribution, and socio-economic status of female and male students in private and public schools were significantly different from each other. In private school students, the highest correlation was found between obesity total and socio-economic status, while the lowest correlation was found between obesity total and the physical activity dimension. In public school students, the highest correlation was found between the obesity dimension and BMI, and the lowest correlation was found between the physical activity dimension and socio-economic status.

Keywords: Obesity, obesity awareness, adolescent, private and public school, students

INTRODUCTION

Obesity is a growing public health concern affecting all age groups, characterized by abnormal or excess fat accumulation with detrimental effects on health.[1-4] It significantly increases the risk of chronic conditions such as diabetes, heart disease, and joint pain.[5-7] Recognizing its prevalence and associated comorbidities underscores the importance of raising awareness and promoting preventative measures.[8-10] Early detection and intervention are crucial in mitigating the risk of obesity-related health complications, emphasizing the need for effective preventive health policies.[11-14] The World Health Organization (WHO) states that the number of people suffering from obesity worldwide is more than 500 million.[15,16] The prevalence of obesity in Turkiye is increasing day by day and was reported to be 21.1% in 2019.[17,18] In Turkiye, 19.9% of the population aged 15 years and over are classified as obese, while 33.7% are recorded as overweight.[19,20] Early awareness-raising in society and especially among adolescents plays a critical role in combating common diseases such as obesity.[21,22] Most children and young people spend too much time at home watching television, using tablets, spending time with game consoles, and spending too much time in front of the computer without participating in social activities.[23] In addition, individuals who adopt a physically sedentary lifestyle increase the risk of obesity due to improper eating habits.[24,25] For these reasons, it is of great importance for individuals to raise awareness about obesity, to raise awareness about the diseases that cause obesity, and to increase obesityawareness.[26]

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Given the enormous burden obesity imposes on both individuals and society, there is an urgent need to deepen our understanding of the factors that influence obesity awareness, particularly among the adolescent population. Adolescence represents a crucial stage in the development of lifelong habits and attitudes towards health and is a critical juncture for targeted interventions. Therefore, this study will contribute to the literature by examining the obesity awareness levels of adolescent students in both private and public schools. Obesity, which is an important risk factor in human life from an early age, is one of the factors that directly affect the quality of life. In order to prevent and treat obesity, increasing obesity awareness and transferring healthy lifestyle habits to individuals is the most fundamental step. The aim of this study is to examine the obesity awareness of adolescent students in private and public schools.

METHODS

Ethics

This study was carried out with the permission of Kırıkkale University Social and Human Sciences Researches Ethics Committe (Date: 18.10.2023, Decision No: 2023/207445). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Research Model

The research is a quantitative study. The research was conducted based on the descriptive survey model. The survey model refers to the type of research in which factors such as the opinions, attitudes, abilities, interests, and skills of the individuals participating in the research are determined.[27]

Research Group

The research group for this study consists of 1393 private and public school students between the ages of 10 and 13 in Kırıkkale province. Participation was completely voluntary. All participants participated in the study with an informed consent form. Participants who did not want to participate in the study left without completing the form before continuing the study.

Data Collection

The data collection process consisted of two stages: The first stage consisted of a personal information form including questions about gender, age, BMI, socio-economic status, physical activity for half an hour or more per week, and daily food distribution. In the second stage, the Obesity Awareness Scale developed by Allen[28] and adapted into Turkish by Kafkas and Özen[29] was used. The Obesity Awareness Scale is a measurement tool with three subscales and a total of 20 items. The first subscale (obesity awareness) consists of 8 items; the second subscale (nutritional awareness) consists of 7 items; and the third subscale (physical activity awareness) consists of 5 items. An increase in score indicates an increase in obesity awareness.

Statistical Analysis

Cronbach's alpha was analyzed to determine the reliability of the study. The "Kolmogorov-Smirnov" test was used to determine whether the data were normally distributed. Statistical information on the anthropometric characteristics of the children studying in private and public schools, sub-dimension scores of the Obesity Awareness Scale, BMI, daily meal distributions, and socioeconomic status groupings was determined and entered into the SPSS program. The data obtained were analyzed in the IBM SPSS 25.0 program. The mean and standard deviation descriptive statistics of all the data were calculated. An independent sample t-test was applied to analyze the differences between groups, and Cohen's effect size was also analyzed between groups. The Obesity Awareness Scale's Cronbach's alpha was determined to be 0.786.

RESULTS

When the descriptive data on children in private and public schools were examined, the highest percentages of the participants in the age variable were in the 12 age group with 37.8%, 61.5% of the male students and 38.5% of the female students, 58.1% of the participants were public school students and 41.9% were private school students, 9.5% of the participants were overweight, 20.9% were overweight, and 39.8% were normal weight according to BMI data. According to the data on physical activity for half an hour or more per week, 19.5% did nothing, 51.6% did physical activity 1-2 days per week, 17.9% did physical activity 3-4 days per week, and 10.9% did physical activity 5-6 days per week. It was observed that 6.5% of the participants had 2 meals, 52.8% had 3 meals, 36.2% had 4 meals, and 4.5% had 5 meals daily (**Table 1**).

When the statistical data on anthropometric characteristics of children in private and public schools, sub-dimensions of the obesity awareness scale, BMI, frequency of physical activity for half an hour or more per week, daily food distribution, and socio-economic status groupings were examined according to the private and public school variables, it was seen that there was a significant difference in all variables. While BMI had the lowest effect size, the highest effect size was observed in the physical activity dimension (**Table 2**).

Table 1. Descriptive data of children in private school and state school

Demographics characteristic	n	%
Total number of participants	1393	100
Age		
10 years	169	12.1
11 years	459	33
12 years	526	37.8
13 years	229	17.2
Gender		
Boys	857	61.5
Girls	536	38.5
School type		
Private school	583	41.9
State school	810	58.1
BMI		
Overweight	133	9.5
At risk for overweight	291	20.9
Normal weight	555	39.8
Underweight	414	29.7
Socioeconomic status groupings		
High	421	30.2
Medium	834	59.9
Low	138	9.9
Half an hour or more per week physical activity		
Nothing	272	19.5
1-2 days	719	51.6
3-4 days	250	17.9
5-6 days	152	10.9
Daily meal distributions		
Two meals	91	6.5
Three meals	735	52.8
Four meals	504	36.2
Five meals	63	4.5

BMI: Body mass index.

Table 2. T-test results and effect sizes of students in private and public schools according to the sub-dimensions of the obesity awareness scale

Variables	Private School (n=583)	State School (n=810)	Total (n=1393)	p	Cohen's d
Anthropometric					
Age (yrs)	12.3±1.0	12.0±0.9	12.9±0.9	0.001*	0.31
Height (cm)	153.7±9.7	152.0±9.4	152.7±9.6	0.001*	0.18
Body mass (kg)	50.4±13.2	47.7±11.9	48.9±12.8	0.001*	0.22
BMI (kg/m²)	21.2±4.9	20.5±4.3	20.8±4.6	0.001*	0.15
Obesity awareness and sub dimension scores					
Obesity	29.2±4.5	28.4±5.2	28.7±4.9	0.001*	0.16
Nutrition	19.5±3.3	18.9±3.6	19.1±3.5	0.001*	0.17
Physical activity	16.7±3.0	15.3±3.4	16.5±3.2	0.001*	0.43
Obesity total	65.3±9.2	63.5±10.7	64.3±10.1	0.001*	0.18
Half an hour or more per week physical activity					
Nothing	101	171	272	0.001*	
1-2 days	316	403	719	0.001*	
3-4 days	107	143	250	0.001*	
5-6 days	59	93	152	0.001*	
BMI					
Weak	151	263	414	0.001*	
Normal weight	243	312	555	0.001*	
Overweight	103	188	291	0.001*	
Very overweight	86	47	133	0.001*	
Daily meal distributions					
Two meals	38	53	91	0.001*	
Three meals	313	422	735	0.001*	
Four meals	207	297	504	0.001*	
Five meals	25	38	63	0.001*	
Socioeconomic status groupings					
High	51	87	138	0.001*	
Medium	335	499	834	0.001*	
Low	197	224	421	0.001*	

BMI: body mass index; *p<0.001

According to the gender variable, when the statistical data on the anthropometric characteristics of girls and boys, age and height, obesity awareness scale sub-dimensions, BMI, daily food distribution, and socio-economic status groupings were examined, it was seen that there was a significant difference in the sub-dimensions of all of these variables. When the effect sizes between genders were examined, it was seen that the effect size was the smallest in body weight, while the effect size was the highest in the physical activity sub-dimension (Table 3).

When the data of female students in private and public schools were examined, it was seen that there was no significant difference in the anthropometric characteristics of female students in private and public schools, and when the statistical data related to the sub-dimensions of the obesity awareness scale, BMI, frequency of physical activity for half an hour or more per week, daily food distribution, and socio-economic status groupings were examined, it was seen that there was a significant difference in the sub-dimensions of all of these variables. When the effect sizes of the scores of female students in private and public schools were analyzed, the lowest effect size was seen in height scores, while the highest effect size was seen in the physical activity sub-dimension. When the data of male students in private and public schools were examined, it was seen that there was no significant difference in the age variable among the anthropometric characteristics, and when the statistical data related to the sub-dimensions of the obesity awareness scale, BMI, frequency of physical activity for half an hour or more per week, daily food distribution, and socio-economic status groupings were examined, it was seen that there was a significant difference in the sub-dimensions of all of these variables. When the effect sizes of the scores of male students in private and public schools were analyzed, the lowest effect size was found in the physical activity sub-dimension, and the highest effect size was found in body weight (Table 4).

Table 3. T-test results and effect sizes of male and female students in private and public schools according to the sub-dimensions of the obesity awareness scale

Variables	Girls (n=536)	Boys (n=857)	Total (n=1393)	p	Cohen's d
Anthropometric					
Age (yrs)	12.0±0.9	12.2±0.9	12.1±0.9	0.001*	0.22
Height (cm)	151.4±9.2	153.6±9.7	152.7±9.5	0.001*	0.24
Body mass (kg)	48.1±12.3	49.3±12.7	48.8±12.6	0.061	0.01
BMI (kg/m²)	20.9±4.4	20.8±4.7	20.8±4.6	0.836	0.02
Obesity Awareness and sub dimension scores					
Obesity	27.8±4.8	29.7±4.9	28.7±4.9	0.001*	0.40
Nutrition	18.2±3.4	19.3±3.6	19.1±3.5	0.001*	0.32
Physical activity	14.5±3.2	16.6±3.2	16.5±3.2	0.001*	0.66
Obesity Total	64.5±9.9	64.1±10.3	64.3±10.1	0.579	0.04
Half an hour or more per week Physical activity					
Nothing	104	168	272	0.001*	
1-2 days	289	430	719	0.001*	
3-4 days	92	158	250	0.001*	
5-6 days	51	101	152	0.001*	
BMI					
Weak	154	260	414	0.001*	
Normal Weight	215	340	555	0.001*	
Overweight	128	163	291	0.001*	
Very overweight	39	94	133	0.001*	
Daily meal distributions					
Two meals	36	55	91	0.001*	
Three meals	276	459	735	0.001*	
Four meals	197	307	504	0.001*	
Five meals	27	36	63	0.001*	
Socioeconomic status groupings					
High	55	83	138	0.001*	
Medium	320	514	834	0.001*	
Low	161	260	421	0.001*	

BMI: body mass index; *p<0.001

Table 4. T-test results and effect sizes of girls in private and public schools and boys in private and public schools according to the sub-dimensions of the obesity awareness scale

n=1393	Private school girls (n=223)	State school girls (n=313)	p	Cohen's d	Private school boys (n=360)	State school boys (n=497)	p	Cohen's d
Anthropometric								
Age (yrs)	11.9±0.9	12.0±0.9	0.278	0.11	12.4±0.9	12.0±0.9	0.153	0,44
Height (cm)	151±8.6	151±9.6	0.966	0.01	155.2±10.6	152.2±9.3	0.001*	0,30
Body mass (kg)	47.1±12.8	48.7±12.4	0.146	0.13	52.5±13.5	47.1± 11	0.001*	0,56
BMI (kg/m²)	20.4±4.3	21.1±4.5	0.072	0.16	21.7±5.2	20.1±4.1	0.001*	0,34
Obesity awareness and sub dimension scores								
Obesity	28.3±4.2	30.5±5.2	0.001*	0.47	29.1±4.7	28.3±5.2	0.001*	0,16
Nutrition	19.6±3.0	18.9±3.7	0.001*	0.21	19.4±3.4	18.8±3.7	0.001*	0,17
Physical activity	18.8±2.9	16.3±3.4	0.001*	0.80	16.6±3.1	16.3±3.3	0.001*	0,09
Obesity Total	65.6±8.4	63.6±10	0.001*	0.33	65.1±9.6	63.4±10	0.001*	0,24
Half an hour or more per week Physical activity								
Nothing	40	64	0.001*		61	107	0.001*	
1-2 days	127	162	0.001*		189	241	0.001*	
3-4 days	38	54	0.001*		69	89	0.001*	
5-6 days	18	33	0.001*		41	60	0.001*	
BMI								
Weak	71	83	0.001*		80	180	0.001*	
Normal weight	89	126	0.001*		154	186	0.001*	
Overweight	55	73	0.001*		48	115	0.001*	
Very overweight	8	31	0.001*		78	16	0.001*	
Daily meal distributions								
Two meals	14	22	0.001*		24	31	0.001*	
Three meals	112	164	0.001*		201	258	0.001*	
Four meals	84	113	0.001*		123	184	0.001*	
Five meals	13	14	0.001*		12	24	0.001*	
Socioeconomic status groupings								
High	22	33	0.001*		29	54	0.001*	
Medium	128	192	0.001*		207	307	0.001*	
Low	73	88	0.001*		124	136	0.001*	

When the correlation data of the private and public school students in Table 5 are analyzed, it is seen that the low correlationis between the physical activity dimension and socio-economic status, and the lowest correlation is between obesity status and the physical activity dimension in private and public schools. When the correlation data of the private school students were analyzed, it was seen that the low correlation was between obesity total and socio-economic status, and the lowest correlation was between obesity total and physical activity dimension. When the correlation data of the public school students were analyzed, it was seen that the low correlation was between the obesity dimension and BMI, and the lowest correlation was between the physical activity dimension and socio-economic status. In summary, it can be said that BMI is highly correlated with obesity, and obesity is also highly correlated with socio-economic status (Table 5).

Table 5. Data on the correlation results of BMI with socio-economic status, physical activity, and nutrition status of students in private and public schools

Variable	r	r^2	p value
Obesity total-socioeconomic status	0.091**	0.008	0.01
Private and State School			
Obesity total -BMI	0.071**	0.005	0.01
Obesity dimension-BMI	0.059*	0.003	0.05
Obesitydimension-socioeconomic status	0.079**	0.006	0.01
Obesity dimension-physical activity dimension	0.058*	0.003	0.05
Nutrition dimension- BMI	0.079**	0.006	0.01
Nutrition dimension-socioeconomic status	0.064*	0.004	0.05
Physical activity dimension-socioeconomic	0.100**	0.01	0.01
Physical activity dimension-physical activity	0.062*	0.004	0.05
Private School			
Obesity total- socioeconomic status	0.128**	0.016	0.01
Obesity total - physical activity	0.091*	0.008	0.05
Obesity dimension- socioeconomic status	0.125**	0.016	0.05
Nutrition dimension-socioeconomic status	0.121**	0.015	0.05
State School			
Obesity total -BMI	0.131**	0.017	0.01
Obesity dimension-BMI	0.219**	0.047	0.01
Nutrition dimension- BMI	0.172**	0.03	0.01
Physical activity dimension-socioeconomic	0.123**	0.015	0.01

**, Correlation is significant at the 0.01 level (2-tailed); *, Correlation is significant at the 0.05 level (2-tailed); BMI: body mass index

DISCUSSION

The aim of this study was to investigate obesity among adolescent students in private and public schools. Awareness of the participants. When the results of the research were examined, it was determined that the highest participation rate was in the 12 age group and the lowest participation rate was in the 10 age group. According to gender, male students had the highest participation rate. It was determined that the participation of public school students was higher than that of private school students. According to BMI results, it was determined that the rate of students with normal weight was higher than that of those with overweight, overweight, and underweight. According to the socio-economic status grouping, the highest value was found to be 59.9% of students with medium economic status. It was observed that the highest frequency of doing physical activity for half an hour or more per week was 1-2 days. In the daily meal distribution rates, it was concluded that those who ate three meals had the highest value.

Anthropometric measurements performed between students in private and public schools showed that there were significant differences between age, height, body weight, and BMI values. In addition, it was determined that there was a significant difference between the obesity awareness scale and its sub-dimensions: the frequency of physical activity performed for half an hour or more per week, daily meal distributions, and socio-economic status. According to Yüksel and Akıl's[30] study, while the physical activity levels of young people were low, their awareness of obesity was high, but their eating habits were found to be negative. Their study showed that adolescents have high awareness of obesity, but they behave negatively in terms of nutrition. In a study conducted by Vançelik et al.[31] it was found that doing regular sports significantly affected the nutritional habit score, a large proportion of university students (87.4%) skipped meals, and students frequently skipped breakfast. Ermiş et al.[32] reported that socio-demographic characteristics and healthy lifestyle habits were related to nutritional habits. These studies are in parallel with our study. Lytle[33] showed that physical activity and nutrition-oriented course programs temporarily create changes in weight or eating habits. The study reveals that curricula based on physical activity and nutrition have a short-term effect on eating habits or weight.

It was determined that there was a significant difference between boys and girls in the anthropometric characteristics of age and height, sub-dimensions of the obesity awareness scale, BMI, daily food distribution, and socio-economic status. When the effect sizes between genders were analyzed, it was observed that the lowest effect size was in body weight and the highest effect size was in the physical activity sub-dimension of the obesity awareness scale. In the study conducted by Uyar et al.[34] it was determined that the majority of students with underweight or normal weight were in public schools, while overweight and obese students were private

school students. It was determined that students in the underweight and normal categories had high rates of taking nutrition to school, while overweight and obese students were more likely to eat from the school canteen and take nutrition with them.

It is observed that children who both receive nutrition and are fed from the school canteen or cafeteria are in the overweight and obese category. This shows that the number of meals increased. It can be said that children with increased number of meals and shorter meal intervals are exposed to weight gain. In different studies conducted by Alasmari et al.,[35] Özkan et al.,[36] Yıldırım et al.,[37] Aslan and Gündoğdu,[38] it was concluded that there was no significant difference between genders in obesity awareness levels. Al-Zandee and Ünlü[39] and Coşkun and Karagöz[40] determined that boys are more active than girls in physical activity levels between genders and that boys perform physical activity at higher rates.[46,47] In our study, it was observed that there was a difference in obesity awareness and physical activity level between genders.

There was no significant difference in the anthropometric characteristics of female students between private and public schools, but there was a significant difference in obesity awareness, BMI, frequency of physical activity of half an hour or more per week, daily food distribution, socio-economic status groupings, and sub-dimensions. In female students, the effect size was lowest in height scores and highest in the physical activity sub-dimension. Among the anthropometric characteristics of male students, there was no significant difference in the age variable, but there was a significant difference in height, body weight, obesity awareness, BMI, physical activity frequency of half an hour or more per week, daily food distribution, socio-economic status groupings, and sub-dimensions. Alphan, Keskin, and Tatlı[41] found that both male and female students in private schools were at least 3 cm taller than both male and female students in public schools. In our study, it was observed that there was no significant difference between female students in private and public schools according to the height variable. In our study, it was seen that there was a difference in the height variable for male students. In male students, the lowest effect size was found in the physical activity sub-dimension and the highest effect size was found in body weight.

In the correlation data of total students between private and public schools, the highest correlation was found between the physical activity dimension and socio-economic status, and the lowest correlation was found between obesity status and the physical activity dimension. In the correlation data of the students in private schools, the highest correlation was between obesity total and socio-economic status, and the lowest correlation was between obesity total and physical activity dimension. When the correlation data of the public school students were analyzed, it was seen that the highest correlation was between the obesity dimension and BMI, and the lowest correlation was between the physical activity dimension and socio-economic status. In the study conducted by Yıldırım et al.,[37] it was determined that the obesity awareness of individuals with high physical activity levels was also high. In the study conducted by Bereket and Atay[42] and Marwaha et al.,[43] it was determined that those with high socio-economic levels had high obesity problems. Salmon et al.,[44] and Chhatwal et al.[45] found that children with high socio-economic status were more likely to be obese than poor children.

CONCLUSION

As a result, it is seen as a result of the studies that students who study in private schools and have a high socio-economic status have a high probability of obesity. We can say that the probability of obesity is low in favor of students studying in public schools or students with lower socio-economic status. Good economic opportunities create more comfort in students who have the opportunity to study in private schools, and instead of taking food to school, they benefit from the cafeteria at school, feed from the school canteen, take more calories during the day, consume packaged products, and increase the frequency of nutrition from 3 meals to more than 3 meals. The full-day nature of private schools also keeps students tied to school all day and limits their mobility. Students who eat more than they should and move less than they should will increase their weight and BMI. Public school children should be prevented from getting less nutrition than they need due to a lack of resources. In this case, regardless of the circumstances, it is the responsibility of families, educators, health scientists, and the whole society to educate our children correctly, raise their awareness against obesity, and raise awareness of healthy living. Building a healthy society means raising good generations, preparing a good future, creating good economic conditions, and preparing a prosperous life for everyone. It is thought that our future generations should be raised with this awareness.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was carried out with the permission of Kırıkkale University Social and Human Sciences Researches Ethics Committe (Date: 18.10.2023, Decision No: 2023/207445).

Informed Consent
Participation was completely voluntary. All participants participated in the study with an informed consent form. Participants who did not want to participate in the study left without completing the form before continuing the study.

Referee Evaluation Process
Externally peer-reviewed.

Conflict of Interest Statement
The authors have no conflicts of interest to declare.

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Author Contributions
All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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